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## **REMARKS**

### **Claims:**

Claim 11 is cancelled as its substance is redundant with claim one as amended, and it depended from claim 1. Claim 31 also is cancelled and its subject matter incorporated into claim 26, as amended. Claims 34-49 are new claims. The amendments to the claims and the new claims establish the patentability of the system and method of the claimed invention over the art cited by the Examiner, by setting forth the limitation of monitoring semiconductor wafer processing by capturing still and/or video images of the process upon the occurrence of a triggering condition. Following is a more detailed discussion of the amended and new claims in view of the art cited by the Examiner.

### **Claim Rejections: 35 U.S.C. § 103(a): Smargiassi in view of Bandaru**

The Examiner rejected all of the claims, 1-33, as unpatentable over Smargiassi et al. (U.S. Pat. Pub. No. U.S. 1001/0043735) in view of Bandaru et al. (U.S. Pat. Pub. No. U.S. 2002/0024538). The Examiner indicated that Smargiassi teaches all elements found in claim 25 of the present application and, although Smargiassi does not teach communication through internet to a remote viewer, Bandaru demonstrates that such features were well-known and used in the art. Office action at 2.

Applicant respectfully disagrees that the present invention is obvious over Smargiassi in view of Bandaru. The system and method disclosed in Smargiassi do not teach monitoring in a way that renders the present invention obvious. Specifically, Smargiassi does not disclose the present invention to capture images at the time triggering conditions may occur. Rather, Smargiassi teaches (1) monitoring by periodically capturing images and comparing them to a reference image; and (2) analyzing optical density changes to detect wafer fragments.

The present invention is a system for capturing images based on the occurrence of triggering conditions in a semiconductor processing chamber. “The camera captures a still image or a video, which can be captured based on one or more trigger conditions.” Application at 3:14-15. “An imaging processor can be connected to the camera to detect one or more predefined criteria.” Application at 2:23-3:1. “The views can be captured based on the occurrence of one or more predetermined criteria. The criteria include a component movement, a component failure, an out-of-range condition, or predefined time interval.” Application at 5:3-5. “First, the operator defines one or more triggering sequences. . . The triggering sequence is downloaded to the camera 130 and sensors are suitably set up to trigger the camera based on the triggering conditions (step 204). Upon being triggered, the camera 130 takes a still image or a brief video of one or more portions of the chamber (step 208).” Application at 10:14-19.

All independent claims have been amended and new claims have been added to claim the disclosed system and method for monitoring processing of substrates based on triggering conditions for capturing images for remote monitoring. Claim 25 as amended now claims the camera as having both an idle mode and a triggered mode in which it captures images in the process chamber based on the occurrence of at least one triggering condition. As established above, the triggering mechanism is disclosed in the specification, and no new matter has been added by the described amendments.

The system and method disclosed in Smargiassi do not perform monitoring by capturing images based on a plurality of triggering conditions which may or may not occur. Smargiassi teaches a system and method for detecting wafer fragments. Abstract; page 1, ¶¶ 0008-0011. In contrast to the method of the instant invention, *i.e.*, a camera capturing an image *only upon occurrence of a triggering condition*, Smargiassi teaches *comparing an image, taken routinely at*

*the end of each process cycle*, to a reference image taken in the absence of a wafer, and thereafter quantifying the amount of deviation from the reference image. Abstract; page 2, ¶¶ 0015-0016, pages 4-5, ¶¶ 0042. In an alternative embodiment, the system dispenses with the comparison to a reference image. Instead, an actual image *taken routinely* at the end of a process cycle is analyzed for optical density contrast changes which may indicate the presence of a wafer fragment. Page 4, ¶ 0038; page 5, ¶ 0047. In either embodiment of Smargiassi, the camera does not capture an image based upon a triggering condition, which may or may not occur during wafer processing; instead, the camera takes an image, routinely at the end of each process cycle, to do an image analysis either by comparison to a reference image or by optical density analysis.

Neither Smargiassi nor Bandaru teaches a system that captures an image, either video or still image, only upon occurrence of a triggering condition during processing. Moreover, there is no suggestion in either reference to program the processor to trigger the camera upon occurrence of a triggering condition. Bandaru has nothing to do with wafer processing. Accordingly, the present invention cannot be obvious over Smargiassi in view of Bandaru, or over either reference alone. As amended, claim 25 is allowable over the cited art, and Applicant respectfully requests the Examiner's reconsideration of this independent claim.

The Examiner states that claims 1, 24, 26, and 33 are substantially similar to claim 25 and therefore are rejected on the same basis as claim 25. Applicant respectfully disagrees. Claims 1, 24, 26, and 33 have been amended to make note of the novel feature of the present invention relating to image capture only upon occurrence of at least one triggering condition. Because claim 33 depended from claim 31, and claim 31 has been cancelled (its subject matter has been moved into claim 26), claim 33 has been amended to depend from claim 26, rather than claim 31. Therefore, the same remarks above apply to these four claims, which are now patentable over

the cited art.

Similarly, claims 2-23 depend directly or indirectly from claim 1; claims 27, 28, and 32 as amended depend from claim 26 as amended; and claim 31 has been cancelled, with its subject matter incorporated into claim 26. Each of these remaining claims is now allowable over the cited art for the same reasons set forth above.

Claim Rejections: 35 U.S.C. § 103(a): Smargiassi in view of Bandaru and in further view of Pirak:

The Examiner also rejected claims 15-17 under 35 U.S.C. § 103(a) over Smargiassi in view of Bandaru and in further view of Pirak et al. (U.S. Pat. No. 5,400,771). The Examiner notes that Pirak (Fig. 1) shows, “a camera and a light source placed outside and a pipe 18 including fiber-optic illumination guide and fiber-optic cable connected to the camera for illuminating and inspection inside.” The Examiner further notes that the monitoring set-up taught by Pirak is used in medical and surgical fields. *Id.*

Applicant respectfully disagrees with this rejection for all of the reasons set forth above, because claims 15-17 depend from claim 1 which, as amended, cannot be obvious over Smargiassi in view of Bandaru. Applicant further disagrees for additional reasons based on Pirak.

First, Pirak discloses an endotracheal intubation assembly and method in the medical arts, for monitoring proper placement of an endotracheal tube used to help an anesthetized patient breathe during surgery. Pirak, Col. 1, ll. 9-16. The disclosed invention in Pirak is not analogous art that would have been considered by one of ordinary skill in the art of semiconductor processing at the time of the invention. To rely on a reference under 35 U.S.C. § 103, the art must be analogous. MPEP § 2141.01(a).

In order to rely on a reference as a basis for rejection of an applicant’s invention, the reference must either be in the field of applicant’s

endeavor or, if not, then be *reasonably pertinent* to the particular problem with which the inventor was concerned.

MPEP § 2141.01(a)(citing *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992)(emphasis supplied). A reference is considered “reasonably pertinent” if ““even though it may be in a different field from that of the inventor’s endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor’s attention in considering his problem.”” MPEP § 2141.01(a) (quoting *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992).

Here, as the Examiner has noted, the invention disclosed by Pirak is not in the same field of endeavor as the present invention. The issue, accordingly, is whether the Pirak is “reasonably pertinent,” *i.e.*, whether the Applicant logically would have reviewed medical and surgical equipment in approaching the problem he intended to address in his invention. As explained below, the Pirak reference is not “reasonably pertinent” to the problem with the state of the art at the time of the invention that Applicant addressed through the present invention.

The problem that Applicant intended to address was the inability, through the existing art, remotely to monitor wafer movement and process conditions during processing to detect deviant conditions as they might arise. Application at 2:11-19. Applicant addressed this concern by inventing a monitoring system and method to capture images *only* upon occurrence of predetermined, specified triggering conditions, and to send these images over the Internet for remote monitoring. An objective was to allow “manufacturer’s representatives and field personnel” to assist in complex repair operations without traveling to the location of wafer processing, and without being present for constant monitoring. Applicant was further concerned in the present invention with illuminating a process chamber where high temperatures,

chemicals, and debris could cause damage to a camera if the camera were inside the chamber.

Application at 2-3.

The concerns addressed by the invention (endotracheal intubation assembly and related method) disclosed by Pirak were (1) proper initial placement of an endotracheal tube during intubation of a patient, and (2) monitoring of an endotracheal tube during surgery to ensure that proper positioning is maintained. Pirak, Col. 1, ll. 40-62. It is the monitoring objective that is most related to the issue addressed by the present invention, which concerns remote monitoring of semiconductor wafer processing. In contrast to the present invention, however, Pirak is concerned with *on-site* monitoring by a surgical team of instrument positioning in a patient during surgery. An inventor in the field of *remote* monitoring devices for semiconductor wafer processing would not have looked to the field of endoscopy devices to determine how to resolve a semiconductor wafer processing *remote* monitoring issue.

Moreover, Applicant would not have looked to the surgical and medical arts to resolve an illumination issue with regard to monitoring a semiconductor wafer process chamber. The illumination issues faced by applicant concerned capturing images of a chamber where high temperature, chemicals, and debris would be present and would present special problems. The image capturing in Pirak is not concerned with such factors; rather, the invention in Pirak was concerned with transmitting illumination and capturing images from a flexible tube. As the concern in Pirak is remote from the issues faced by Applicant, the fields of endeavor are not “reasonably pertinent.”

Second, like Smargiassi, Pirak does not monitor by capturing images only upon the occurrence, if any, of a triggering condition. Rather, like Smargiassi, the invention in Pirak compares actual images to a reference image. The invention in Pirak monitors placement by

capturing images constantly -- not only upon a triggering condition as in the present invention -- and alerts the operator once a comparison of actual images to the reference image establishes that the instrument is out of position. Col. 5, ll. 1-30. The triggering condition in Pirak (displacement of the instrument) does not result in image capture, but rather, in an alert to the operator.

Accordingly, it is Applicant's position that claims 15-17 cannot be obvious over Smargiassi in view of Bandaru and in further view of Pirak.

In light of the above, it is respectfully submitted that all of the new and amended claims now pending in the subject patent application should be allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Date:

7/20/04

Respectfully submitted,

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